

Abstract of the Disclosure

According to one embodiment of the invention, a high pressure anneal is utilized to form titanium silicide at the bottom of a contact hole, at a pressure of at least approximately 1.1 atmospheres, from a reaction between deposited titanium and underlying silicon. When such high pressures are used, temperatures of less than approximately 700 degrees Celsius are utilized. According to another embodiment of the invention, a conductive plug fill material is deposited within a contact hole such that the plug structure is relatively free of voids. Either during deposition of the conductive plug fill material or after such deposition, the conductive plug fill material is subjected to a high pressure force-fill, at a pressure of at least approximately 1.1 atmospheres. When such high pressures are used, temperatures of less than approximately 700 degrees Celsius are utilized for the force-fill. Aluminum can be used for the conductive plug fill material when using this embodiment of the invention. In further embodiments, dielectrics deposited between conductive layers are reflowed at high pressure and low temperature. Still further, multiple metalized layers are connected by vias filled with conductive material using high pressure and low temperature.

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